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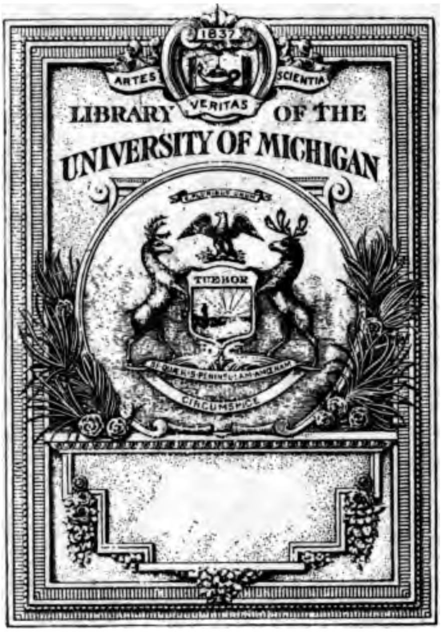
DESCRIPTION OF AND INSTRUCTIONS

FOR THE

MANAGEMENT OF THE 15-INCH S. B. GUN AND CARRIAGE, TABLE OF RANGES, DESCRIPTIVE PLATES, ETC.



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ORDNANCE MEMORANDA No. 28.

Description of and Instructions for the Management of the 15-inch S. B.
Gun and Carriage, Table of Ranges, Descriptive Plates, etc.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

APPENDIX 11.

DESCRIPTION OF AND INSTRUCTIONS FOR THE MANAGEMENT OF THE FIFTEEN-INCH SMOOTH-BORE GUN AND CARRIAGES, TABLE OF RANGES, DESCRIPTIVE PLATES, ETC.

By the ORDNANCE BOARD U. S. ARMY.

(2 plates.)

15-INCH SMOOTH-BORE MUZZLE-LOADING GUN.

The gun is fully described in the Ordnance Manual for 1861, page 18.

PRINCIPAL DIMENSIONS.

Caliber	inches..	15
Length of bore	do....	165
Distance from face of muzzle to axis of trunnions	do....	120.45
Total length of gun	do....	190
Weight of gun	pounds..	49,099
No preponderance.		

The sights are two in number, one placed on the breech and one on the upper surface of the piece in front of the trunnions.

The breech sight consists of a brass limb, secured by screws to the upper surface of the gun in a vertical plane through the axis of the bore, and at 55.55 inches from the axis of the trunnions, measured on a line parallel to the axis of the bore. It is 16.625 inches in height, and has a longitudinal slit with three holes 0.2 inch in diameter, one at each end of the slit and one at the middle point, with intervals of 2.25 inches between the sight holes.

The front sight is a single piece of brass fastened to the gun by two screws, its upper extremity terminating in a blade.

The elevations are given by means of an arc and index, the former attached to the base of the breech and the latter to the elevating fulcrum on the carriage.

Projectiles.—The shell is 14.85 inches in diameter. It has two ears at the extremities of a diameter at right angles to the axis of the fuse hole. Thickness of the shell, 2.5 inches.

The solid or cored shot is also provided in like manner with ears for the shell hooks.

Weight of shell, 330 pounds; weight of shot, 450 pounds.

Charges are of sphero-hexagonal powder, having a granulation of 100 to the pound and specific gravity of 1.800; the pressure with no charge to exceed 28,000 pounds per square inch.

Weight of full charge, 130 pounds.

378982

The paper time-fuses are used with the water-capped, metallic fuse plug, or with the wooden fuse plug.

The implements and equipments required are as follows:

IMPLEMENTS AND EQUIPMENTS.

For service of gun.

2 sponges.
2 rammers.
2 pass boxes.
2 carrying bars.
2 shell hooks.
1 gunner's pouch.
1 primer pouch.
2 lanyards.
2 thumbstalls.
2 priming wires.
1 water tub.
1 elevating bar.
1 tompion.
1 vent cover.
1 crane.
1 differential pulley (1,000 pounds).
1 ladle.
1 worm.
2 gunner's gimlets.
1 gunner's pincers.
1 gunner's quadrant, brass.
2 vent punches.
To 6 pieces or less.

For service of carriage.

4 maneuvering bars.
1 pinch bar.
1 retraction rope, ⅝-inch steel wire, 20 feet long.
1 set floor boards.

TOOLS.

For service of shells.

1 Fuse plug extractor.
1 Fuse mallet.
1 Fuse setter, brass.
1 Fuse cutter, knife.
1 Fuse wrench, for water cap.
1 Fuse reamer, for wooden plug.

For service of carriage.

1 screw wrench, large.
1 double wrench for 4½ and 3¼ inch nuts.
1 double wrench for 2 and 1⅝ inch United States standard nuts.
1 single wrench for 1½-inch old style nuts.
1 hammer, claw.
For 6 pieces or less.

ALTERED SEA-COAST CARRIAGES, MODEL 1883, WITH HYDRAULIC CYLINDERS, FOR 15-INCH GUN.

(2 plates.)

In order to strengthen the old 15-inch barbette carriage, that it may resist the strains caused by increasing the powder-charge of the gun to 130 pounds, and to adapt it to the 11-inch rifle, and also to facilitate its manipulation, the following alterations have been made:

TOP CARRIAGE.

Inner braces have been inserted between the cheek-plates, to give additional stiffness.

A buffer-plate has been added to the front transom, to receive the shock caused by running the carriage into battery.

The number and strength of the transoms have been increased; the front and rear ones having guide-hooks attached to restrict the motion of the carriage on the chassis.

A heavy cross-head has been added to the rear transom, connected with the front and middle transoms by two cross-head braces. This cross-head, extending as it does below the line of the upper surface of the chassis rails, is so slotted that it may receive and retain the piston-rod of the hydraulic cylinder.

The front and rear of the cheek-plates have been extended by means of bronze plates, which act as boxes for the steel truck-wheels, the front ones working in journals and the rear ones on an eccentric axle; the system being so arranged that the carriage shall always move with rolling friction, except for a distance of about 6 inches from the front buffers; the eccentric axle permits rolling friction for the whole distance when it is desired.

For the old cast-iron elevating fulcrum there has been substituted one of wrought iron, arranged with steps for the convenience of the gunner, and also with an eye for attaching the pulley for the "retraction rope."

The additional alterations required for the carriages used with the 11-inch rifle are the trunnion-bed plates, made to receive the eccentric trunnion-rings attached to the gun, to overcome the preponderance, and the replacing of the elevating fulcrum by bronze elevating arcs and gears.

CHASSIS.

Two kinds of chassis are altered. One with the narrow rail and the other with the deep rail. To make the chassis of equal height bracket bolsters are added to the narrow rails at the front, middle, and rear; the rear bracket bolster is deep enough to allow not only for the difference in depth of the two kinds of rails, but also to permit of the use of the old narrow-rail traverse wheels.

The other alterations of the chassis are common to the two carriages, and are the following:

The insertion of vertical braces between the plates of the rails to give additional stiffness.

The addition of an inclined rail on top of each rail of the chassis to cause an increasing resistance of the carriage when recoiling; and also to facilitate its running into battery.

The addition of an hydraulic cylinder, connected to the two rails by circular-bent straps, which also act as additional transoms.

This cylinder contains a piston-head perforated with four circular holes, three-quarters of an inch in diameter.

The piston-rod passes through a gland in the rear cylinder-head, and also through a slot in the cross-head, the end terminates in an eye, through which passes a steel pin, bearing two steel rollers to permit the easy adjustment of the piston-rod when the carriage ascends the inclined rails.

The addition of two buffer transoms, one attached to the front of the rails and the other to the rear, each being supplied with four rubber buffers to take up the shock when the carriage runs to the extreme limits of the rails.

To stiffen the rails of the chassis several transoms are added in rear of the hydraulic cylinder.

The addition of a wrought-iron prop and screw to the middle of each rail to permit of easy adjustment of the bearings due to a want of level of the platform.

Heavy wrought-iron bolsters are placed under the front of each rail. These bolsters are firmly bolted to the pintle transom and each rests on two conical rollers, which roll upon a plate on the platform, for ease and convenience of traversing.

The addition of a retraction apparatus placed at the rear end of the rails for the purpose of moving the carriage from battery. This con sists of a drum revolved by means of gearing, to which the retraction rope is attached.

The addition of a retaining apparatus, consisting of a pawl and lever, the pawl engaging the teeth of the rack on the top carriage. This is so arranged with a steel spring that in its normal condition it will always retain the top carriage at the point where it may be left by the recoil. By pulling the lever and releasing the pawl the carriage will, owing to the inclined rails, readily run into battery. The lever may be held back by means of a pin, and it would be well that this should be done when maneuvering the carriage by hand.

The crane has been transferred from the top carriage to the chassis rail, it being arranged so that it will be in a position to load when the carriage has recoiled to any point beyond 4 feet and 6 inches from the front, and 7 inches from the rear buffers.

For the better convenience of the cannoneers, side and rear platforms of wire netting are added.

PRECAUTIONS TO BE OBSERVED.

The carriage is arranged to work almost automatically, but to do this it is necessary that care should be taken of its different parts.

The oil should always be poured in when the piston-rod is within the cylinder; not less than 25 gallons should be used when firing with full-powder charges.

The piston-rod should be kept free from rust in order that it may move freely.

There should be as little play as possible between the pintle transom and key-pin holding it in place, in order to avoid bending the transom.

The pintle rollers and all the wheel and axle journals should be kept well lubricated.

The carriage should be "in battery" when not in use, that the piston-rod may not be exposed to the weather.

The prop-screws should be given one-third of a turn before firing, just sufficient to clear them from the traverse circles.

As the loading crane operates best when the top carriage is 5 feet from the front buffers its position on the chassis should be observed.

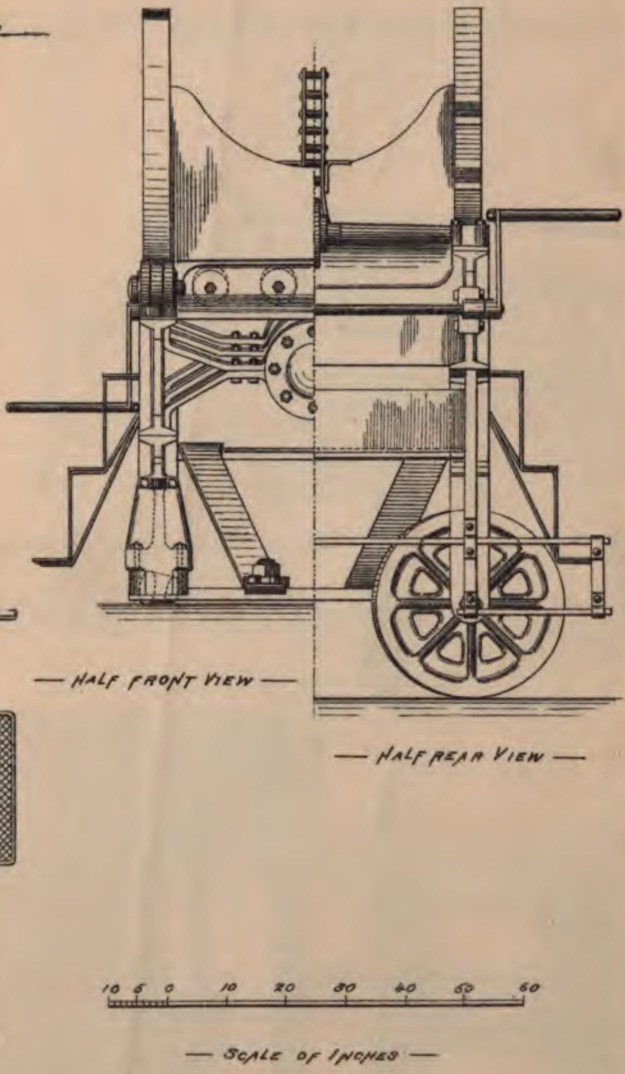
Range table.

[Weight of shot, 455 pounds. Initial velocity, 1,706 feet. Powder charge, 130 pounds.]

Distance of object.	Angle of—				Remaining velocity.	Energy.	Penetration (unbacked wrought-iron).
	Elevation.		Fall.				
Yards.	*Deg.*	*Min.*	*Deg.*	*Min.*	*Feet.*	*Foot-tons.*	*Inches.*
* 0	......	......	......	......	....	....	....
100	......	......	......	7	1,652	8,522	11.4
200	......	3	......	14	1,600	7,994	11.1
300	......	10	......	21	1,550	7,502	10.7
400	......	17	......	28	1,507	7,092	10.4
500	......	24	......	36	1,460	6,656	10.1
600	......	31	......	44	1,420	6,296	9.8
700	......	40	......	54	1,380	5,947	9.5
800	......	49	1	5	1,340	5,607	9.2
900	......	58	1	16	1,302	5,293	8.9
1,000	1	7	1	27	1,266	5,005	8.7
1,100	1	16	1	39	1,230	4,725	8.5
1,200	1	25	1	52	1,197	4,474	8.3
1,300	1	34	2	7	1,166	4,246	7.5
1,400	1	46	2	24	1,138	4,044	7.5
1,500	1	54	2	41	1,111	3,853	7.6
1,600	2	00	2	53	1,083	3,663	7.5
1,700	2	13	3	5	1,055	3,476	7.3
1,800	2	26	3	36	1,032	3,326	7.1
1,900	2	40	3	57	1,010	3,185	6.9
2,000	2	54	4	18	989	3,054	6.8
2,100	3	8	4	42	970	2,938	6.6
2,200	3	22	5	6	950	2,818	6.5
2,300	3	36	5	30	930	2,713	6.4
2,400	3	50	5	55	915	2,614	6.3
2,500	4	4	6	20	895	2,501	6.2
2,600	4	18	6	47	882	2,429	6.1
2,700	4	32	7	14	865	2,336	6.0
2,800	4	46	7	42	851	2,262	5.9
2,900	5	00	8	12	836	2,182	5.8
3,000	5	14	8	48	822	2,110	5.7
3,100	5	31	9	24	807	2,033	5.6
3,200	5	48	10	3	795	1,973	5.5
3,300	6	5	10	43	783	1,914	5.4
3,400	6	22	11	27	771	1,857	5.3
3,500	6	42	12	11	758	1,794	5.2
3,600	7	2	12	55	747	1,742	5.1
3,700	7	24	13	39	734	1,681	5.1
3,800	7	49	14	23	725	1,641	5.0
3,900	8	14	15	7	714	1,592	4.9
4,000	8	39	15	51	704	1,546	4.8
4,100	9	4	16	36	696	1,512	4.75
4,200	9	29	17	22	687	1,474	4.7
4,300	9	54	18	9	678	1,436	4.7
4,400	10	19	18	57	670	1,402	4.65
4,500	10	44	19	45	661	1,365	4.55
4,600	11	14	20	33	653	1,330	4.5
4,700	11	44	21	22	645	1,299	4.45
4,800	12	14	22	9	637	1,267	4.39
4,900	12	44	22	59	629	1,236	4.27
5,000	13	14	23	49	622	1,207	4.22
5,100	13	44	24	39	615	1,180	4.2
5,200	14	14	25	36	608	1,153	4.19
5,300	14	44	26	33	601	1,126	4.14
5,400	15	16	27	36	594	1,102	4.04
5,500	15	49	28	43	588	1,079	4.03
5,600	16	23	29	50	581	1,054	4.00
5,700	16	58	31	7	575	1,032	3.97
5,800	17	33	33	24	569	1,011	3.92
5,900	18	8	34	44	563	989	3.88
6,000	18	46	36	17	557	969	3.8

* Energy and penetration on basis of 450 pounds weight of projectiles.

PLATE I.



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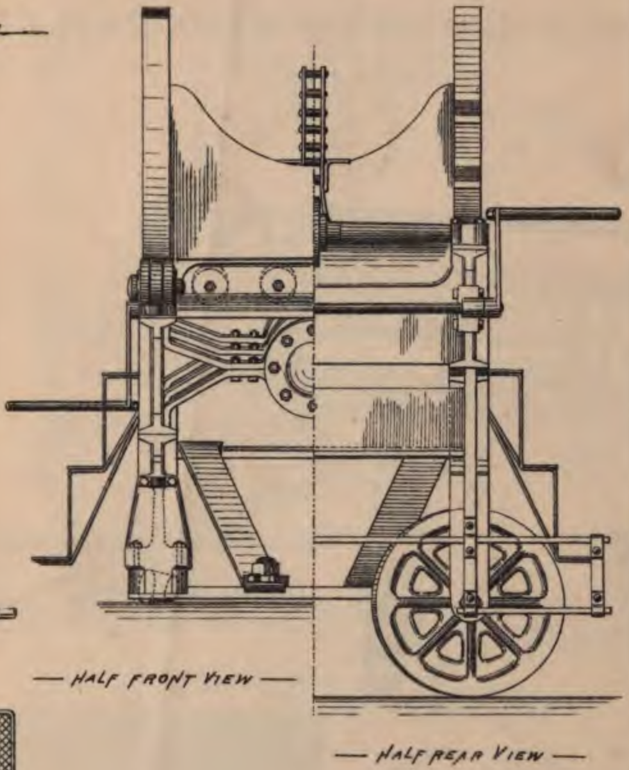

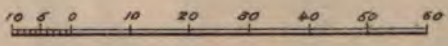

— SCALE OF INCHES —

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PLATE I.

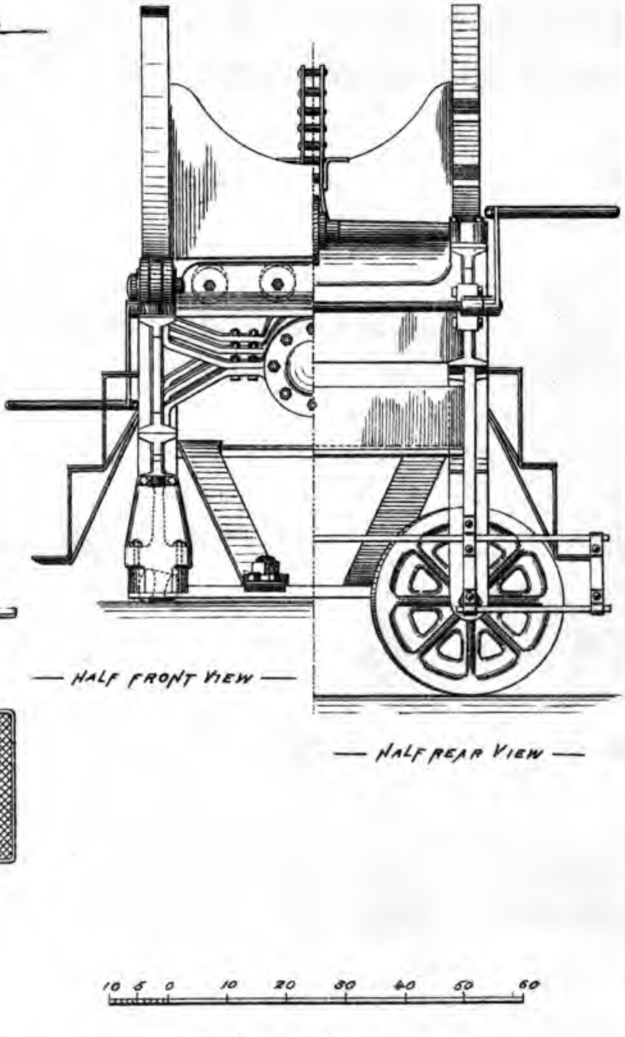

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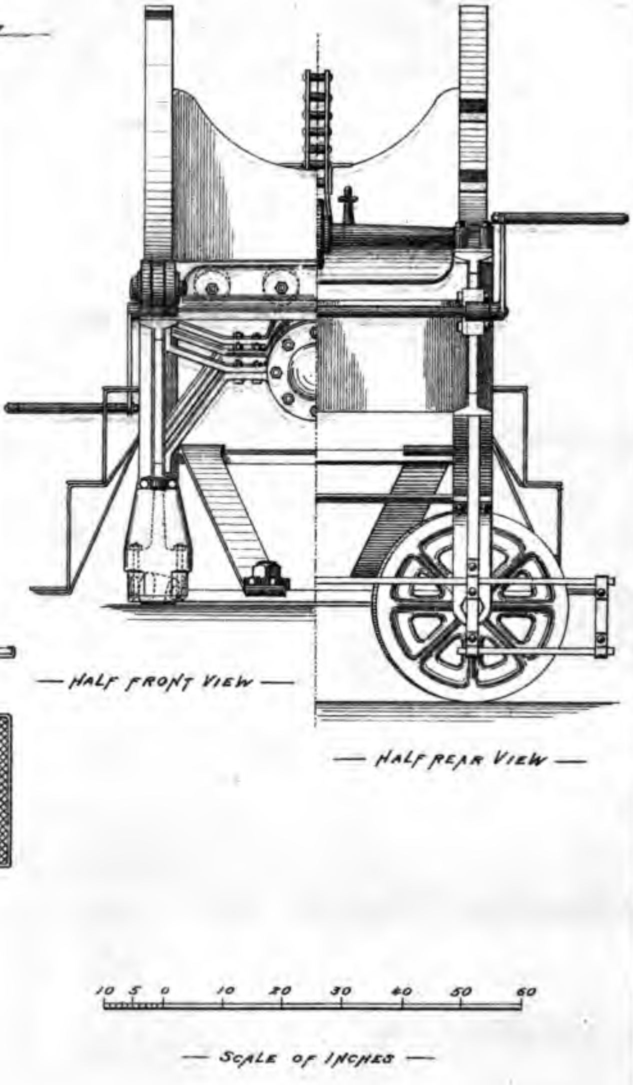
PLATE II.



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